

CLAIMS

- 1 A syringe comprising a barrel, an associated plunger and a needle unit, the needle unit comprising:
- a housing connected to one end of the barrel;
 - a needle-mounting hub;
 - a biasing element arranged to urge the hub inwardly of the barrel;
- and
- a stop element blocking inward movement of the hub into the barrel until the hub is released from the stop element in response to the plunger reaching the final part of, or the conclusion of, its delivery stroke to allow retraction of the needle-mounting hub, wherein the barrel or a part for connecting the needle housing to the barrel is provided with a seal which contacts an outer peripheral surface of the stop element.
- 2 A syringe according to claim 1 wherein the seal is a lip seal which tends to deflect radially inwardly when a fluid within the barrel is pressurised during the delivery stroke of the plunger.
- 3 A syringe according to claim 1 or 2 wherein the seal is integral with the barrel or said connecting part.
- 4 A needle unit for use with a syringe comprising a barrel and an associated plunger, wherein the needle unit comprises:
- a housing connectable to one end of the barrel;
 - a needle-mounting hub;
 - a biasing element arranged to urge the hub inwardly of the barrel; and
 - a stop element blocking inward movement of the hub into the barrel until the hub is released from the stop element in response to the plunger reaching the final part of, or the conclusion of, its delivery stroke to allow retraction of the needle-mounting hub, wherein the stop element is arranged to snap engage within the housing to couple the needle hub to the housing and retain the biasing element in a stored energy condition.
- 5 A needle unit for use with a syringe comprising a barrel and an associated plunger, wherein the needle unit comprises:

a housing connectable to one end of the barrel;
a needle-mounting hub;
a biasing element arranged to urge the hub inwardly of the barrel;
a stop element blocking inward movement of the hub into the barrel until the hub is released from the stop element in response to the plunger reaching the final part of, or the conclusion of, its delivery stroke to allow retraction of the needle-mounting hub; and
a sheath for enclosing the needle,
wherein the housing includes one or more openings through which the sheath and stop element can make contact.

6 A needle unit according to claim 5 wherein the stop element is coupled to the needle mounting hub and the sheath and the stop element can make contact so that the sheath can be used to apply axial force to the stop element without significantly stressing the coupling between the stop element and the hub.

7 A needle unit according to claim 5 or 6 wherein the sheath and the stop element can make contact such that the sheath restricts movement of the stop element, to prevent release of the needle mounting hub from the stop element.

8 A needle unit according to any one of claims 5 to 7 wherein the housing is provided with one or more openings with which one or more projections on the stop element engage, the openings being arranged so that one or more portions of the sheath is locatable in abutment with the one or more projections.

9 A needle unit according to claim 8 wherein each of said one or more projections on the stop element engage with an inwardly directed rib or the like on the housing.

10 A needle unit according to claim 8 or 9 wherein said one or more projections on the stop element has an inclined outer face such that it may ride over the inner surface of the housing before snap engagement with the housing.

11 A syringe according to any one of claims 1 to 3 or a needle unit according to any one of claims 4 to 10 wherein the plunger is hollow and retraction of the needle-mounting hub is into the hollow plunger.

12 A syringe according to any of claims 1 to 3 or 11 or a needle unit according to any one of claims 4 to 11 wherein, once the housing or the connecting part is connected to the barrel, the force required to free the housing or the connecting part from the barrel is substantially in excess of the force required to effect the connection to the barrel

13 A syringe according to any of claims 1 to 3, 11 or 12 or a needle unit according to any one of claims 4 to 6 wherein the housing or the connecting part is engaged, or engageable with the barrel with a snap fit.

14 A syringe according to any one of claims 1 to 3 or 11 to 13 or a needle unit according to any one of claims 4 to 13 wherein the biasing element is a coiled compression spring, arranged in encircling relation with the needle.

15 A syringe according to any one of claims 1 to 3 or 11 to 14 or a needle unit according to any one of claims 4 to 14 wherein the needle mounting hub and the stop element are formed as plastics mouldings such that the stop element is axially captive with the hub, the stop element and the hub being disengageable from each other during said final part of, at the conclusion of, the delivery stroke of the plunger to allow retraction of the needle-mounting hub.

16 A syringe according to any one of claims 1 to 13 or 11 to 15 wherein the plunger comprises a piston member and a separate hollow rod.

17 A syringe according to claim 11 wherein the plunger is associated, at its forward end, with a portion which is severable in response to movement of the plunger over the final part of, or at the conclusion of its delivery stroke to allow retraction of the needle mounting hub into the hollow plunger.

18 A syringe according to any of claims 1 to 3 or 11 to 17 or a needle unit according to any one of claims 4 to 15 wherein the stop element is of generally cylindrical configuration and comprises a forward portion within the housing and a rearward portion of tapering configuration.